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Item #			
1/6f	DECLASSIFIED NLK-86-141, 4/89 State. S 2pp. Ball memo for the President.	8/ 4/61	A
2	DECLASSIFIED NLK-86-141, 4/89 WH. . . . 1p. JFK memo to Gen. Taylor.	8/ 7/61	A
3	SANITIZED NLK-86-141, 4/89 DECLASSIFIED NLK-98-73, 5/99 WH TS 2pp. Taylor memo for the President.	8/ 7/61	A
6b	DECLASSIFIED NLK-86-142, 6/98 WH TS 1p. Title page to the Panofsky report.	7/21/61	A
6c	Pending NLK-86-142 WH TS 34pp. Panofsky report.	.../.../...	A
6d	EXEMPTED NLK-86-145, 8/88 WH TS 2pp. Supplement.	7/21/61	A
6e	SANITIZED NLK-86-146, 7/87 ACDA. TS 1p. Seaborg ltr. to Wiesner.	8/ 4/61	A
6h	SANITIZED NLK-86-145, 8/88 CIA. TS 1p. <del>1p</del> Dulles ltr. to Wiesner.	8/ 3/61	A
6i	EXEMPTED NLK-86-147, 7/87 SANITIZED NLK-86-147 APPEAL, 7/87 DOD. TS 2pp. <del>u</del> <del>2</del> SANITIZATION UPHELD NLK 98-40, 4/03 Brown ltr. to Wiesner. SANITIZED: NLK-98-40, 3/04	8/ 3/61	A
6j	EXEMPTED NLK-86-147, 7/87 SANITIZED NLK-86-147 APPEAL, 7/87 JCS. TS 3pp. <del>u</del> <del>3</del> Comments re: Panofsky report.	8/ 2/61	A
6l	SANITIZED NLK-86-142, 6/98 S 3pp. <del>u</del> <del>3</del> Bradbury ltr. to Wiesner.	7/17/61	A

FILE LOCATION

From the NSF: Subjects: Nuclear Weapons: Panofsky Panel: 8/ 4/61 - 9/ 5/61, Box 302

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60	SANITIZED NLK-86-142, 6/98 C TS 2pp. <del>U</del> <del>2</del> John S. Foster ltr. to Wiesner.	8/ 2/61	A
7	EXEMPTED NLK-76-108, 12/23/76 + UPHOLD NLK-84-182, 9/84; SANITIZED NLK-86-143 3/9 WH. TS 3pp. <del>U</del> <del>3pp.</del> <del>Bundy memorandum of minutes of NSC meeting of 8/ 8/61.</del>	<del>9/ 5/61</del>	<del>A</del>
<p>Note for the Archivist:</p> <p>Document 7 is also located in the NSF: M&amp;M: NSC Mtgs., 1961, No. 490, Box 313.</p>			

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Copy for Mr. Bundy

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AUG 4 1961

MEMORANDUM FOR THE PRESIDENT

Subject: Report of Panel on Nuclear Testing

In response to Dr. Wiesner's request I have reviewed the report of the Panel on Nuclear Testing and have given consideration to the course of action which the United States should now pursue in the light of the conclusion of the Panel that any decisions in the near future concerning the resumption of nuclear testing can be governed primarily by non-technical considerations.

On the basis of this assessment it would appear that the dominant factors to be considered in determining US policy on this question in the immediate future are those relating to the over-all posture of the United States as regards our allies, world opinion, and the USSR, particularly in the light of our general approach to the problem of Berlin. Our policy on the resumption of nuclear testing should likewise take into account the effects of any present moves both on prospects of realistic negotiation on disarmament, and on the longer-range military security considerations to which the Panel has referred.

On the basis of these factors it would appear to me that the most advantageous course would be to defer any announcement of test resumption until at least the end of the year, to reaffirm, in response to questions, US freedom to test upon prior announcement, and to proceed with such preparations as are necessary to achieve technical readiness for weapons tests of highest priority early in 1962. The announcement in each case would be only a few days before the actual test.

If on

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By SKF NLK-86-141 4/89  
NARA Date



If on the basis of the Panel's assessment it is concluded that an early test resumption would not contribute significantly to our immediate preparations for a potential crisis in Berlin, I believe that a deferral of this step would serve to increase support and cooperation in those measures of preparedness we deem most essential. I believe, too, that deferral of such an announcement would enhance our position in the forthcoming General Assembly, increase support for our position in the Geneva test ban negotiations, and afford the most favorable circumstances for the US initiatives contemplated in the field of disarmament.

In the longer range, it seems to me, considering the possible risks to the security of the country, testing for military weapons purposes should be resumed if a safeguarded treaty ban cannot be agreed, although the final determination should be made in the light of the circumstances existing at the time. Accordingly, I would urge that while deferring an announcement of test resumption pending at least the achievement of a state of technical readiness which would permit the conduct of a significant test series, preparations toward that end should proceed forthwith. The achievement of such a state of readiness would, I believe, contribute to the flexibility we will need in timing any announcement of test resumption, since I am convinced we should be prepared to follow any such announcement quite promptly with an actual test.

Mr. McCloy concurs in these recommendations.

/s/ George W. Ball

ACTING SECRETARY

Acting Secretary



August 7, 1961

MEMORANDUM FOR

~~MR. BUNDT~~ General Taylor

The Joint Chiefs took a very strong position against the Penofsky report on testing. I wonder who prepared their analysis. Was it done by one, or two, or three men? Was it done outside of the Defense Department by a group of scientists, or what? This is particularly interesting in view of the fact that the Chairman of the AEC seems to find himself "in general agreement in the findings and conclusions of the report."

J. F. K.

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By <u>SKF</u>	NLK-86-141 NARA Date <u>4/89</u>

Resumption of Testing



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*From Pres' book*  
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THE WHITE HOUSE  
WASHINGTON

7 August 1961

MEMORANDUM FOR THE PRESIDENT

Subject: Report of Ad Hoc Panel on Nuclear Testing

1. The subject report limits itself to the technical questions involved in a decision by the United States on the resumption of testing. However, the paper needs to be read with an eye to the military strategy which the United States intends to pursue in order to determine the attitude on testing which is most favorable to that strategy.

2. The USSR enjoys important military advantages which we need to offset. In the field of strategic weapons, they have the option of a first strike against a known target system and have a better defense against our retaliatory reaction which will eventually include an anti-missile missile probably deployed some years before we can have one of our own. To offset these advantages we need light, high yield warheads adapted to a mobile delivery missile system as well as to the requirements of small multiple warheads and decoys.

3. In the tactical field, the Sino-Soviet Bloc has a very considerable superiority in trained military manpower with which to oppose the United States and its Allies on the ground. The primary requirement for effective tactical weapons in our hands is to offset this manpower. Even though the USSR also had tactical nuclear weapons as good as our own, the net effect would be to reduce the amount of manpower that could be employed safely in the combat zone. Then, it becomes like a football game in which, regardless of a disparity of size of the squads, only eleven men can be played at a time by either side.

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Effective tactical weapons in our hands which are cheap, adaptable to delivery systems that can also use conventional weapons, and which are discriminatory in their destructive effect can provide the United States for the first time with an answer to Soviet manpower without our living in a condition of permanent mobilization.

4. In summary, the pros and cons of testing look differently if we consider the requirements for testing derived from U.S. military strategy.

a. If we are to absorb the first strike, we need a secure retaliatory force, which is mobile and uses lightweight warheads. Further testing is essential to develop such warheads without sacrifice of required yield.

b. If we must conclude that the USSR will beat us to an anti-missile missile, again it is important to test to develop lighter warheads. These will be necessary to permit decoys and multiple warheads to defeat the Soviet AICBM.

c. If we are to have the best of tactical weapons with the characteristics described in paragraph 3 above, we need to resume testing. Although we are not without tactical weapons now, they are generally too large and their aggregate effect too destructive for generalized use in friendly territory. For the safety of our own forces and for the protection of the friendly populations among which we expect to operate, it is more important to us than to the Soviets to perfect very small atomic weapons.

d. Thus, a failure to resume testing seriously retards progress in developing both light strategic warheads and very small atomic weapons. Because of our military strategy, progress in both these fields is worth more to us than to the USSR. This fact argues for a resumption of testing at once unless the most compelling of political arguments can be adduced against it.

*Maxwell D. Taylor*  
Maxwell D. Taylor

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August 2, 1961

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NATIONAL SECURITY COUNCIL

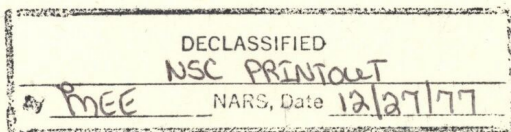
AGENDA

For the Meeting to be held in the  
Cabinet Room of The White House  
on Tuesday, August 8, 1961,  
at 10:00 a.m.

NUCLEAR TESTING

(NSC Actions Nos. 2408, 2419 and 2426; "Report of the Ad Hoc  
Panel on Nuclear Testing", dated July 21, 1961 (to be circulated))

Presentation by the Chairman of the Ad Hoc Panel,  
Dr. Wolfgang K. H. Panofsky.



490th NSC Meeting

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NSC Control No. 20



**INVITEES IN ADDITION TO THE STATUTORY MEMBERS AND  
ADVISERS FOR THE 490th NSC MEETING TO BE HELD ON  
TUESDAY, AUGUST 8, 1961, AT 10:00 a.m.**

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The Attorney General  
The Director, Bureau of  
the Budget  
The Deputy Secretary of  
Defense  
The Deputy Assistant Sec-  
retary of Defense (ISA)  
The Acting Director, U. S.  
Information Agency  
The Military Representative  
to the President  
The Deputy Under Secretary  
of State  
The Chairman, Atomic  
Energy Commission  
The Chairman, Ad Hoc Panel  
on Nuclear Testing  
The Special Assistant to the  
President for National  
Security Affairs  
The Special Assistant to the  
President for Science  
and Technology  
The Deputy Special Assistant  
to the President for  
National Security Affairs

The Special Assistant to the Pres-  
ident, Arthur Schlesinger, Jr.  
The Staff Assistant-Technical,  
Office of the Special Assis-  
tant to the President for  
Science and Technology  
The Military Aide to the President  
The Special Counsel to the President  
The Adviser to the President on  
Disarmament  
The Air Force Military Aide  
to the Vice President  
The U. S. Representative,  
Conference on Discontin-  
uance of Nuclear Weapon  
Tests  
The General Counsel, Treasury  
Department  
The Director, Lawrence Radiation  
laboratory, Livermore, Cal-  
ifornia  
The Director, Los Alamos  
Scientific Laboratory



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490th Meeting of the National Security Council  
to be held in the Cabinet Room of The White House  
on Tuesday, August 8, 1961, at 10:00 a.m.

---

The President of the United States, Presiding  
The Vice President of the United States

AEC

Glenn T. Seaborg, Chairman.

THE ATTORNEY GENERAL

Byron White, Acting Attorney General.

BUREAU OF THE BUDGET

David E. Bell, Director.

CIA

Allen W. Dulles, Director

DEFENSE

Robert S. McNamara, Secretary  
Roswell L. Gilpatric, Deputy Secretary  
William P. Bundy, Deputy Assistant Secretary (ISA)

JCS

Gen. Lyman L. Lemnitzer, Chairman

OCDM

Edward A. McDermott, Acting Director.

STATE

George W. Ball, Acting Secretary  
U. Alexis Johnson, Deputy Under Secretary

TREASURY

Robert H. Knight, The General Counsel

USIA

Donald M. Wilson, Acting Director



WHITE HOUSE

Gen. Maxwell D. Taylor, Military Representative to the President  
 McGeorge Bundy, Special Assistant to the President  
     for National Security Affairs  
 Jerome B. Wiesner, Special Assistant to the President  
     for Science and Technology  
 Walt W. Rostow, Deputy Special Assistant to the President  
     for National Security Affairs  
 Arthur Schlesinger, Jr., Special Assistant to the President  
 Spurgeon Keeny, Staff Assistant-Technical,  
     Office of the Special Assistant to the President  
     for Science and Technology  
 Brig. Gen. Chester V. Clifton, Military Aide to the President  
 Theodore C. Sorensen, Special Counsel to the President  
 John J. McCloy, Adviser to the President on Disarmament  
 Col. Howard L. Burris, Air Force Military Aide to the Vice President  
 Arthur Dean, U. S. Representative,  
     Conference on Discontinuance of Nuclear Weapon Tests

OTHERS

Wolfgang K. H. Panofsky, Chairman  
     Ad Hoc Panel on Nuclear Testing  
 John S. Foster, Jr., Director  
     Lawrence Radiation Laboratory  
     Livermore, California  
 Norris E. Bradbury, Director  
     Los Alamos Scientific Laboratory  
 Bromley Smith, NSC Staff



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AGENDA

- ITEM 1 --
- A. Report of the Ad Hoc Panel on Nuclear Testing,  
July 21, 1961 with Intelligence Supplement
  - B. State Comments on the Report of Panel on Nuclear  
Testing, dated August 4, 1961
  - C. Bradbury comments on Nuclear Testing
  - D. Foster comments on Nuclear Testing



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REPORT  
of the  
AD HOC PANEL ON NUCLEAR TESTING

July 21, 1961

Wolfgang K. H. Panofsky, Chairman  
William O. Baker  
Hans A. Bethe  
Norris E. Bradbury  
James B. Fisk  
John S. Foster, Jr.  
George B. Kistiakowsky  
Frank Press  
Louis H. Roddis  
John W. Tukey  
Walter H. Zinn  
Spurgeon M. Keeny, Jr.,  
Technical Assistant

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WH S&T Cont. No. TS-107  
This document consists of 34 pages,  
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E.O. 12958, Sec. 3.6
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By <i>[Signature]</i> NARA, Date <u>6/1/98</u>

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**PAGES: 34**

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**SUBJECTS: NUCLEAR WEAPONS, PANOFKY  
PANEL, 8/4/61-9/5/61**

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## INTRODUCTION

At the request of the President, the Panel has considered the technical questions involved in a decision by the U. S. on the resumption of testing. The Panel's report is divided into two sections: (1) Present and future unilateral U. S. test detection capabilities and (2) Present and future U. S. and Soviet nuclear warhead capabilities. The status of intelligence of Soviet testing during the moratorium is considered in a separate supplement.

The Panel's task was facilitated by the recent report of the Fisk Panel to Mr. McCloy (2 March 1961), which covered these problems in the context of a possible test ban treaty. After reviewing such new information as had become available since the publication of the Fisk Report, the Panel found that it was able to endorse the relevant portions of the Fisk Report essentially without exception.

In submitting this report, the Panel hopes that it will clarify the technical issues involved in a decision on the resumption of testing. The Panel wishes to emphasize, however, that while these technical issues have an important bearing on this decision, the final decision on whether or not to resume testing also involves very important non-technical or military issues which have not been included in the Panel's considerations.

The Panel also wishes to express its concern over certain statements which have appeared in the press on the subject of resumption of testing.

NLK-00-2

SANITIZED E.O. 12958, Sec. 3.6
By MAD NARA, Date 11/02

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Additional material released  
as a result of this review.



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While some of these statements have been technically highly misleading, they have still given a great deal of information on U. S. programs to the USSR. At the same time, the Panel believes that these statements have seriously detracted from the political gains which have resulted from our constructive position in the Geneva Nuclear Test Ban Negotiations.

#### SUMMARY

We do not know whether or not the USSR has conducted any clandestine tests since November 1958. While some suspicious activity which might be connected with testing has been noted, this activity is equally compatible with other technical activities not involving nuclear tests. The USSR could have conducted underground nuclear tests without providing any intelligence information.

Despite future improvements in our unilateral detection capability, the USSR could still carry out a limited number of clandestine underground tests in the kiloton range which would very likely escape detection. The USSR could also carry out larger explosions, even up to yields in the megaton class, at an increasing penalty in time, cost, and test effectiveness, and at increasing risk of detection. The greater the level of Soviet clandestine activity, the greater the possibility would be that it would be discovered through conventional intelligence, including 

Improvements in the yield to weight ratios of strategic warheads that may be achieved through weapons tests would give added flexibility to the

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designs of U. S. strategic systems, in particular with regard to reduced vulnerability and increased mobility. Proof tests would also remove possible doubts concerning the reliability of certain warheads. The significance of these developments is in part dependent on whether future U. S. strategy will emphasize deterrence or counterforce capability. At the same time, the status of Soviet weapons technology is probably such as to create a strong incentive for Soviet weapons tests, especially if the USSR desires smaller, more mobile strategic weapon systems to compensate for the anticipated loss of security of their present missile force when SAMOS becomes operational.

The principal areas of weapon improvements in the tactical weapons field involve: a) economy in the use of fissionable materials; b) reduction in diameter to permit interchangeability with conventional ammunition; and c) enhancement of neutron radiation effects. However, it is difficult to evaluate the potential value of nuclear warhead improvements to either the U. S. or the USSR since there is no established doctrine on the use of tactical weapons.

Enhanced neutron radiation weapons which would be relatively more effective against personnel under certain circumstances may have significance in tactical warfare. A prototype [REDACTED] which would produce some enhancement in neutron radiation at a cost comparable to a conventional fission weapon, is available for test. Pure fusion weapons [REDACTED] would, if technically feasible, combine enhanced neutron radiation

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with low cost. If such devices can be developed in a militarily useful configuration, the most optimistic estimate for earliest availability of a first device for stockpile is 1965.

[REDACTED]

The date for operational availability would, therefore, not be appreciably affected by deferment of test resumption by a year or two. The significance of these developments is strongly dependent on the extent to which future U. S. strategy emphasizes the use of nuclear weapons in tactical warfare.

The present U. S. Nike-Zeus AICBM system is not limited by nuclear warhead performance or lack of knowledge on nuclear kill mechanisms but rather by the highly unfavorable exchange ratio of the cost of Nike-Zeus vs. increased number of enemy ICBM's, especially if the enemy employs decoys. The known vulnerabilities of U. S. ICBM warheads to potential Soviet AICBM defense can be reduced without additional effects tests; however, nuclear tests to search for overlooked sources of vulnerability may become advisable in the future. Increasing the yield to weight ratios of missile warheads is one method of improving the ability of our ICBM's to penetrate potential Soviet AICBM defenses by providing additional payload to incorporate measures to reduce warhead vulnerability or to carry penetration aids such as decoys.

One of the most important considerations in further technical developments is the possibility of surprises. In general, as far as yield to weight

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improvements is concerned, surprises are very unlikely in the strategic warheads beyond predicted developments. There could, however, be overlooked phenomena in weapons effects of various kinds. In the area of tactical nuclear weapons, where the room for invention is large, the possibility of important surprises is correspondingly great.

The range of weapon development tests which can be undertaken would not be seriously impaired if only underground tests were permitted. Nevertheless, it should be recognized that the restriction to underground tests would make some tests more difficult and costly. In addition, some weapons effects tests at high altitude of interest to (but on the basis of present knowledge not critical to) the AICBM problem could not be carried out if testing is only permitted underground.

In the absence of tests by either the U. S. or USSR, the U. S. would retain a degree of technological superiority in nuclear weapons for some time. If the U. S. continues to refrain from testing and the USSR engages in clandestine underground testing, the USSR could gain technological superiority in nuclear weapons to the extent discussed in the body of this report in as little as three to four years of extensive testing. If both the U. S. and USSR resume testing, the two countries will probably both approach the same general level of warhead technology in areas of interest in the relatively near future.

Although the limitations on our weapons progress imposed by lack of nuclear tests can to a considerable extent be compensated by efforts in other fields, such a self-imposed limitation would, in the long run, impair the rate

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of U. S. military progress. However, none of the specific weapons tests now discussed appear to be of such urgency from the technical and military point of view that a reasonable delay in reaching a formal decision on the resumption of nuclear testing would be critical. Therefore, any decisions in the near future concerning the resumption of nuclear testing can be governed primarily by non-technical considerations.

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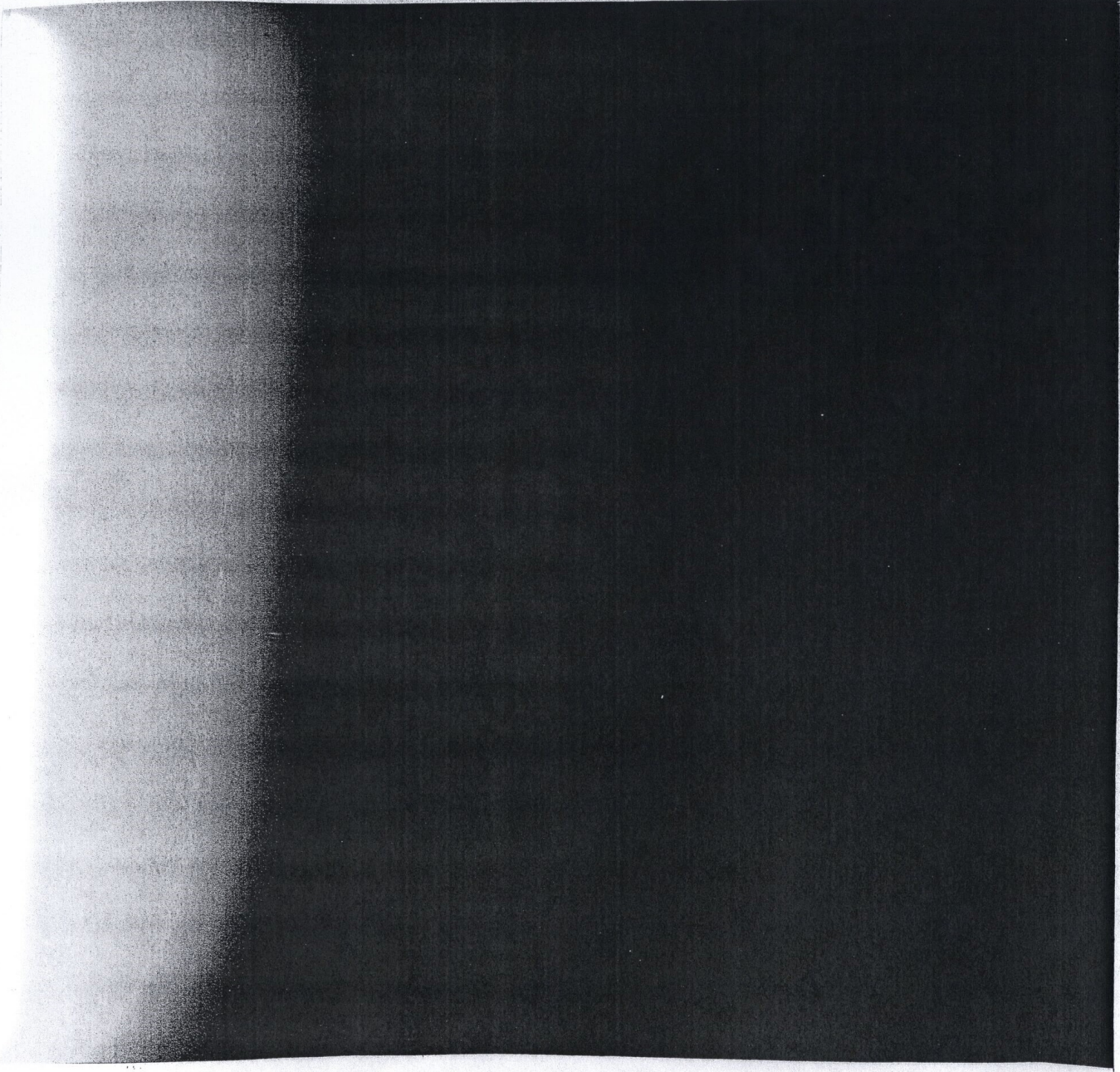
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I. Unilateral U. S. Test Detection Capability

The U. S. nuclear test detection system consists of acoustic, electromagnetic, radioactivity and seismic sensors deployed around the USSR and its satellites.

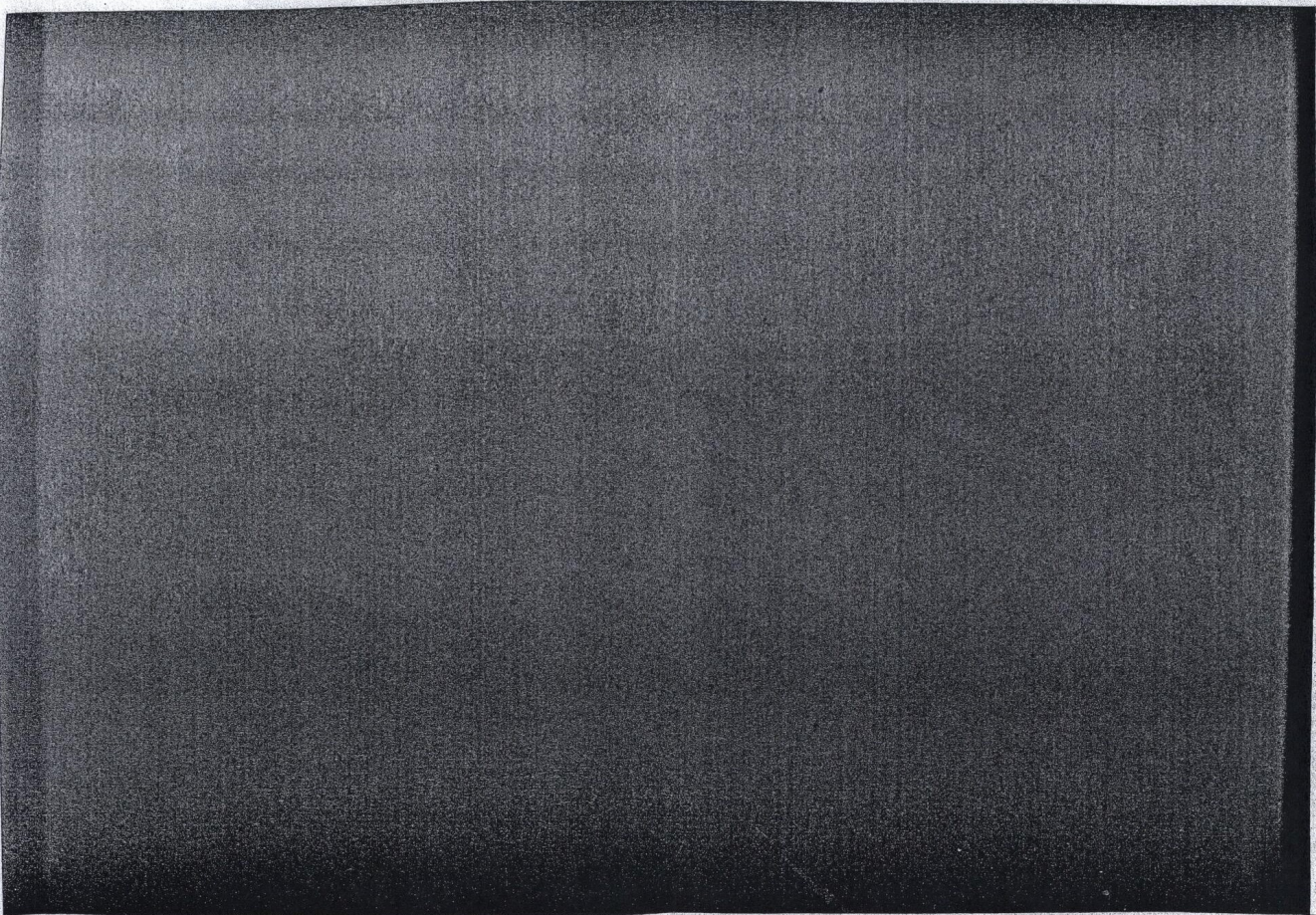


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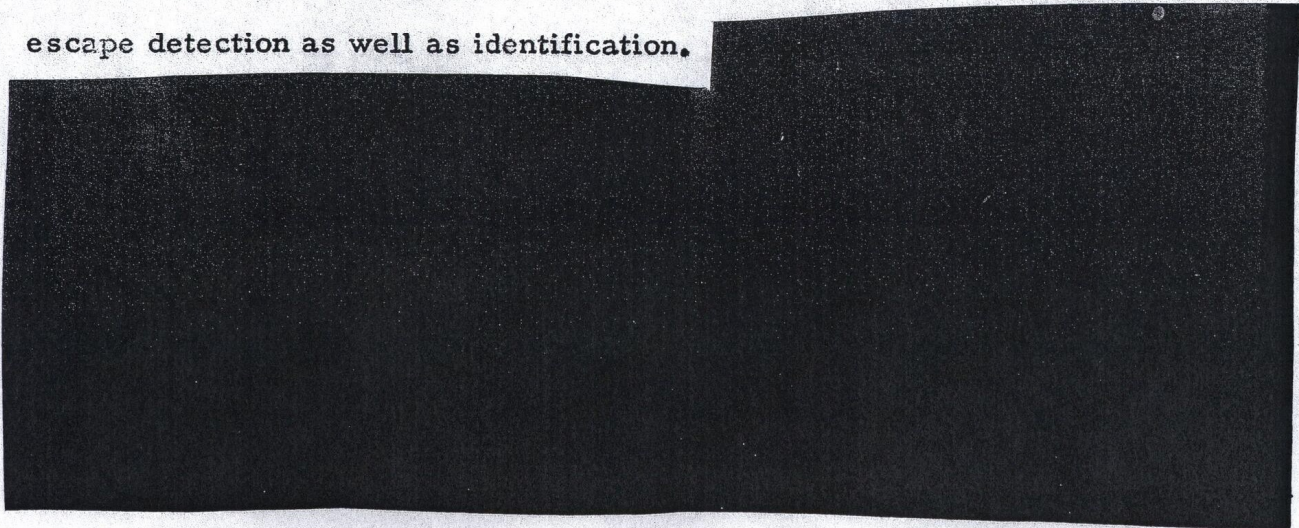


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With sufficient incentive and effort, tests can be conducted underground in large cavities in order to "decouple" the seismic signal and thus even escape detection as well as identification.



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[REDACTED]

Intelligence sources may, therefore, be useful in evaluating detected but unidentified seismic events. Although no specific experience exists on detecting decoupled tests, intelligence data may be particularly useful in view of the size of the effort involved in such tests. Since missile launchings can be detected with a high degree of confidence, the U.S. may expect to be aware of unexplained space vehicles which might be used for a space test. Hence, concealed space tests would have to be carried out under the guise of a different mission.

Thus, concealment tactics would be required to assure that clandestine tests with yields greater than a few kilotons would be successfully hidden from the U.S. unilateral detection system supported by other intelligence information. However, with such efforts, there is little doubt that identification or even detection by the physical detection system can be avoided.

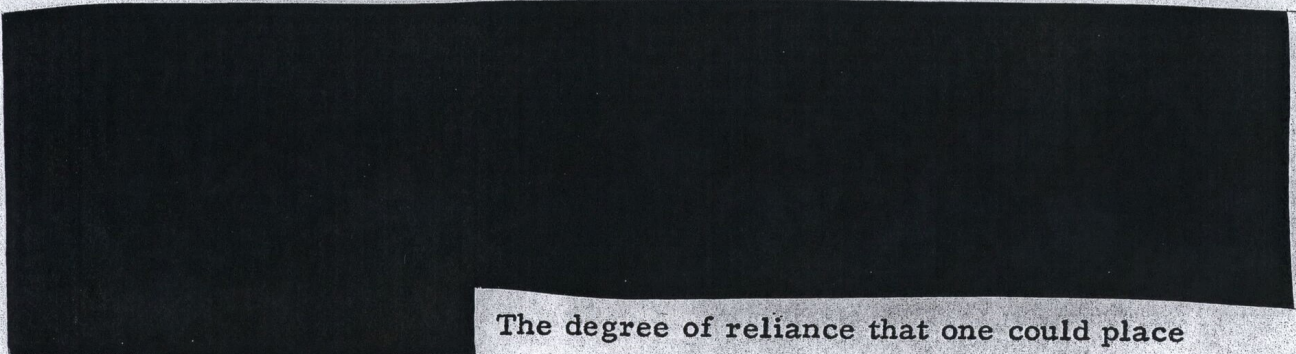
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The degree of reliance that one could place on such intelligence even over an extended period of time, of course, is impossible to assess. However, the greater the level of Soviet clandestine activity, the greater the possibility that the activity would be discovered through conventional intelligence.

## II. Present and Future U. S. and Soviet Nuclear Warhead Capabilities

### A. INTRODUCTION

Three situations have been considered concerning the resumption of nuclear testing:

- Case I: No further testing by either the U. S. or USSR
- Case II: Unlimited underground testing by both the U. S. and USSR
- Case III: No further testing by the U. S. and very extensive clandestine underground testing by the USSR to the maximum extent not verifiable by unilateral U. S. technical detection system.

Atmospheric tests have not been included in connection with our discussion of weapon development tests since restriction to underground tests will not seriously impair the range of warhead development tests which can be undertaken. Nevertheless, it should be recognized that restriction to underground

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tests would make some tests more difficult and costly. In addition, restriction to underground testing will make it impossible to carry out some weapons effects tests at high altitude of interest to, but not critical to, the AICBM problem. In this connection, it should be noted that, while the U. S. has carried out such high altitude effects tests in the past and obtained important information, the USSR has probably not as yet conducted such tests. If no atmospheric tests are carried out by either the U. S. or the USSR, neither side will be able to conduct complete field exercises of systems involving nuclear weapons. This limitation would probably lower the degree of confidence placed by each side in their own nuclear weapons systems. The possibility of testing in outer space has not been included in either the case of unlimited testing or the case of Soviet clandestine testing, since these do not appear to be within the immediate capabilities of either the U. S. or USSR and, therefore, would not affect the capabilities of either country in the near future.

In general, it is apparent that under Case I, no testing, and Case II, unlimited testing, the nuclear weapon technologies of the U. S. and USSR would probably eventually tend to equalize. This would occur in Case I through espionage and information leaks, and in Case II through progress toward the natural limitations in the field. Under Case III, no U. S. but clandestine Soviet testing, the nuclear warhead capabilities of the USSR could surpass those of the U. S. in as little as three to four years of very extensive

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clandestine testing. It should be noted, however, that in order for the USSR to surpass the U. S. in all weapon categories concurrently, there would have to be a very large number of clandestine tests which would greatly increase the probability that suspicious activity would be discovered by conventional intelligence, in particular once SAMOS is operational.

The discussion which follows concentrates on the characteristics of warheads for specific weapons systems. While there also has been an attempt to indicate where some of the unknown possibilities may lie, one of the most important considerations in further developments is a possibility of the appearance of actual surprises. In general, as far as yield to weight improvement is concerned, surprises are very unlikely in the strategic warheads beyond the predicted developments. There could, however, be overlooked phenomena in weapons effects of various kinds. In the area of tactical nuclear weapons, where the room for invention is large, the possibility of important surprises is correspondingly great.

The extent and significance of warhead developments under the varying test conditions have been considered in the following military areas: Strategic Systems, Tactical Systems, and AICBM Systems.

## B. STRATEGIC SYSTEMS

### 1. General

The significance of nuclear weapon developments to strategic systems cannot be judged in isolation from the other technical characteristics and the

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mission of the system. The effectiveness of a strategic weapon system depends not only on weapons design factors such as yield-to-weight ratio and fissionable material requirements, but also on such delivery system design factors as accuracy (CEP), reliability, and vulnerability to enemy attack, as well as on the level of intelligence on enemy targets and on enemy defense capabilities affecting penetration. In addition to those technical considerations, counter-force and deterrent strategies present significantly different problems.

A counter-force strategy is an attack against a large number of military targets, ranging from soft targets such as airfields to hard and mobile missile launch sites. A counter-force strategy here is considered to be either a first strike, pre-emptive attack, or a phase of an exchange between the strategic forces.

For such an attack there is a trade-off between yield and other missile parameters, such as guidance accuracy. For example, an increase in yield by a factor of two would be equivalent to a reduction in CEP by 20% or a 60% equivalent increase in the number of weapons delivered on target. However, whenever there is a question as to whether a sufficient force will survive an initial enemy attack, increases in yield would permit no reduction in the number of delivery vehicles and an improvement in capability could only be found by increased force levels.

The basic question about a counter-force strategy, however, centers not on yield or accuracy but on our ability to obtain precise knowledge of the

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location of a very large proportion of Soviet strategic delivery vehicles. We do not now have this information on Soviet missiles; and, even if it is obtained on fixed missile installations with SAMOS, the problem of maintaining continuously accurate knowledge of the locations of mobile systems such as Polaris will be extremely difficult.

In a deterrent strategy, a minimum number of delivery vehicles (missiles or aircraft) must survive any enemy attack and be able to penetrate enemy defenses to attack cities. Survival depends on such factors as hardness, readiness, reliability, mobility, and secrecy. Decrease in warhead weight at a given yield has contributed to the mobility of deterrent systems. In a deterrent strategy, an increase in the yield of a warhead at a given weight would in principle increase the effects from both blast and fallout against urban areas and industrial complexes more than against hard or mobile military targets. However, warheads of present yields delivered with the CEP's of existing systems would so completely over-kill the population and over-destroy the floor space of urban area targets by blast and fire, that further increases in yields would produce little additional damage. Similarly, probable attacks would result in such extremely high casualty levels from fallout with existing yields that further increases in fallout would produce only small increases in casualties in the surviving population. In fact, consideration of fallout on neighboring friendly countries may lead to the use of clean strategic warheads, even at lower yields, in certain areas.

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A deterrent strategy could in principle be negated by an appropriate combination of defenses (ASW, Air Defense, AICBM, and civilian shelters) or by making a pre-emptive attack against the deterrent system possible through intelligence information which could make information on a large fraction of the deterrent force available in 15 minutes or less.

2. No Further Tests (Case I)

If nuclear weapons of importance to strategic systems were stockpiled by both the U.S. and USSR without further nuclear tests but after extensive laboratory tests, the U.S. would retain some advantage over the USSR in the yield of warheads above [REDACTED], be about equal in the [REDACTED] class and have a substantial advantage in the yield of warheads in the [REDACTED] class and below.

[REDACTED] In the weight range from [REDACTED] suitable for [REDACTED] the U.S. appears to be [REDACTED] In the [REDACTED] class, suitable for the [REDACTED] the yield of the U.S. warhead would appear to be [REDACTED] In the [REDACTED] class, suitable for [REDACTED] the yield of the U.S. warhead appears to be [REDACTED]

As time passes and particularly as U.S. items go into production and deployment, some U.S. developments may become known to the USSR and in these cases the Soviet capability would converge toward that of the U.S.

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With the current available spectrum of warheads, which could be stockpiled without tests, the U. S. would appear to have and to be able to maintain a very strong deterrent strategy by intelligent planning of delivery systems. However, the USSR would probably not be able to develop an advanced mobile ICBM system without additional tests. The U. S. deterrent may be reduced if the USSR succeeds in developing an effective AICBM which makes use of the large vulnerability of U. S. re-entry vehicles; this question is, however, not now connected with the nuclear test question.

3. Unlimited Underground Testing (Case II)

The nuclear technology of both the U. S. and USSR is sufficiently advanced in large weapons suitable for strategic systems that in the 1965-1970 time period weapon yields could approach the limits set by the practically available energy in fission and fusion reactions. In general, for U. S. weapons in the [REDACTED] conservative technical opinion suggests that the yield to weight ratios might be increased by [REDACTED] in systems compatible with delivery vehicle dimensions, while more optimistic predictions suggest that the [REDACTED] or somewhat more. In addition, within one year after the resumption of testing, the U. S. could establish the essential features [REDACTED] which would be available for [REDACTED] [REDACTED] Extension [REDACTED] may be possible but would require tests over several years.

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permitting truck mobile ICBM's, ICBM's launched from air-alert aircraft, smaller Polaris-type submarine systems, improved [REDACTED]

[REDACTED] since the U.S. will probably have to rely more completely on mobility than the USSR. It should be noted, however, that truck mobile ICBM systems would still be possible with existing warheads. There is, however, considerable question whether such systems are desirable from the point of view of safety and adequacy of control.

In summary, continued testing would make a counterforce strategy more difficult for both sides through increased mobility and survivability of second strike force. Continued testing would increase deterrence by contributing, through lowered weapon weights, toward improving survival against an enemy first strike and penetration of enemy defenses. This would be a critical factor to the U.S. only if our deterrence becomes inadequate and if a decrease in weapon weight from [REDACTED] becomes the factor which makes the difference between an adequate and an inadequate deterrence.

4. No Further U. S. Testing and Maximum Soviet Underground Clandestine Testing (Case III)

If U.S. activities were limited to laboratory experiments while the USSR conducted very extensive clandestine underground tests, the USSR would probably achieve approximately present U.S. technology and could surpass it in the lower weight categories. In this situation, the U.S. would not be able to make any significant advances in strategic nuclear weapon technology and would essentially be limited to weapons in stockpile or going into stockpile

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based on previously tested technology. Typical present U.S. capabilities are as follows: [REDACTED]

The USSR would also not be able to make significant advances in weight classes [REDACTED] since clandestine tests will be limited in yield and as noted above would have to [REDACTED] establish reliability and yield accurately. However, in the [REDACTED] the USSR probably already has approximately the same capability as the U.S. Under these circumstances, the USSR could continue development on smaller yield strategic weapons. In particular, the USSR could catch up to the U.S. in the weight class of [REDACTED] in which they were significantly behind in 1958. This weight class would permit them to develop mobile ICBM's of the Polaris and Minuteman type. With further tests, the USSR might be able to achieve eventually [REDACTED] in this class. The small number of tests at higher yields required to obtain full assurance of the behavior of a device of advanced design could of course be conducted either underground or in space, but with additional risk of detection by both technical and conventional means. It is fairly likely that the USSR could develop thermonuclear weapons [REDACTED]

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In summary, comparing Case III, extensive clandestine Soviet testing, with Case II, unlimited underground testing, it would appear that the U. S. capability for a pre-emptive counterforce strategy would be about the same in both situations since the USSR would be able in either case to develop improved mobile systems while our offense force would not be significantly improved. At the same time, the counterforce capability of the USSR would eventually be improved and the deterrent capability of the U.S. correspondingly reduced under Case III as compared with Case II, since the U. S. would not be able to develop smaller warheads to facilitate mobility or to permit the addition of penetration aids to existing warheads. The extent and significance of this change depends on whether U.S. deterrence is considered to become inadequate and how important very small warheads [REDACTED] are considered to be to assure survival of strategic systems or to assure penetration of enemy AICBM defense.

5. "Clean" Weapons

"Clean" weapons, [REDACTED] constitute a special class of strategic weapons. While the reduction in fallout may diminish their usefulness in a deterrent strategy, it is possible that in some circumstances they would be useful to reduce fallout on our allies. With unlimited testing, both the U.S. and USSR could probably develop "clean" weapons [REDACTED]

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[REDACTED]

With no further U. S. testing and maximum Soviet clandestine underground testing, the present U. S. lead in large yield "clean" weapons would probably be maintained because of the difficulty in conducting high yield clandestine tests. [REDACTED]

[REDACTED]

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### C. TACTICAL WEAPON SYSTEMS

#### 1. General

Tactical nuclear weapons are defined as ammunition for defensive and offensive systems whose primary purposes are the conduct of operations, (ranging from very small use of force to large operations), short of all-out war between the primary contestants. The weapons cannot be defined as to yield, size, methods of delivery or effects, but only as to purpose. Tactical nuclear systems can be considered in the role of a "deterrent" strategy to discourage enemy actions (either nuclear or non-nuclear) short of a strategic exchange. Alternatively, tactical nuclear weapons can be considered in the role of a "counterforce" strategy for actual use in large or small quantities on either a broad battlefield or in isolated limited engagements. There exist strong differences of opinion as to whether nuclear weapons can be employed in many cases without escalation into general war. It is difficult to evaluate the potential value of nuclear warhead improvements to either the U. S. or the USSR since there is no established doctrine on the use of tactical weapons.

The principal areas of weapon improvements in the tactical weapons field involve: a) economy in the use of fissionable materials; b) reduction in diameter to permit interchangeability with conventional ammunition; and c) enhancement of neutron radiation effects. Since particular attention has recently been focused on "neutron" bomb in the discussion of the resumption

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of testing, the enhancement of neutron radiation effects is discussed below in some detail in an attempt to clarify the situation.

2. Enhanced Neutron Radiation and Pure Fusion Weapons

Present very low-yield weapons [REDACTED] are effective against personnel mainly by the neutrons they radiate. The penetrating nature of this radiation is particularly effective against personnel inside tanks and similar blast-resistant enclosures. It results in a sharp boundary between lethal area and the territory safe for our troops, and therefore permits the use of such weapons in closer engagements. Reduction in blast damage and radioactivity on the ground would facilitate forward movements of our troops after the use of nuclear weapons. It is therefore natural to seek relative enhancement of these neutron effects. This can be done by attempting to design small yield devices [REDACTED]

Two entirely different types of weapons with enhanced neutron radiation have been conceived by the U. S. weapons laboratories:

[REDACTED]

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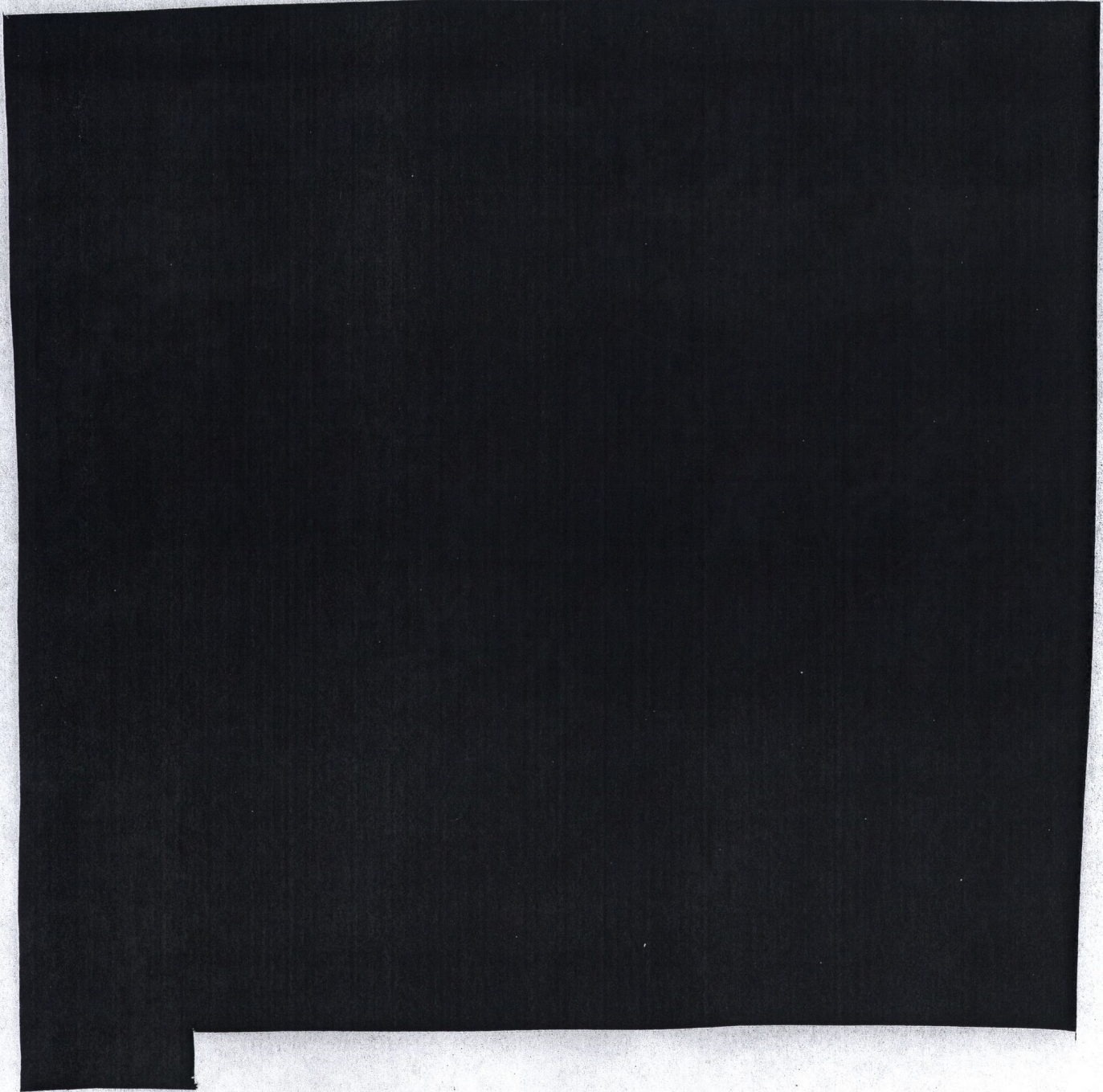
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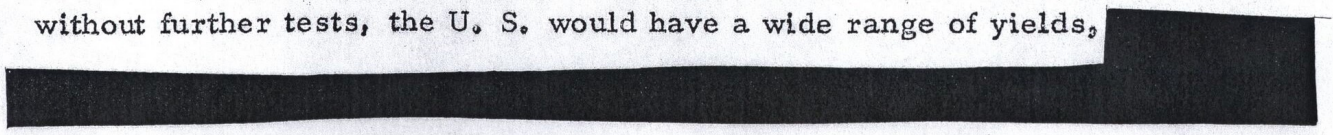
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3. No Further Tests (Case I)

If nuclear weapons of importance to tactical systems were stockpiled without further tests, the U. S. would have a wide range of yields,



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[REDACTED]

Although a considerable number of Soviet tests of devices which might be suitable for tactical warheads have been detected, it is quite possible that a number of tests of low yield devices suitable for this purpose have gone undetected. For those from which signals and debris have been obtained, and presumably all or most of these with yields greater than 5 KT have been detected, it has frequently been possible to estimate the nuclear economy and make reasonable, though not very precise or assured, deductions about the weight and possible diameters.

[REDACTED]

[REDACTED] However, with the accumulation of fissionable material, the Soviets may wish in the future to develop [REDACTED]

[REDACTED]

With no further testing, it is expected that both the U. S. and USSR will not stockpile radical extrapolations from tested weapons.

[REDACTED]

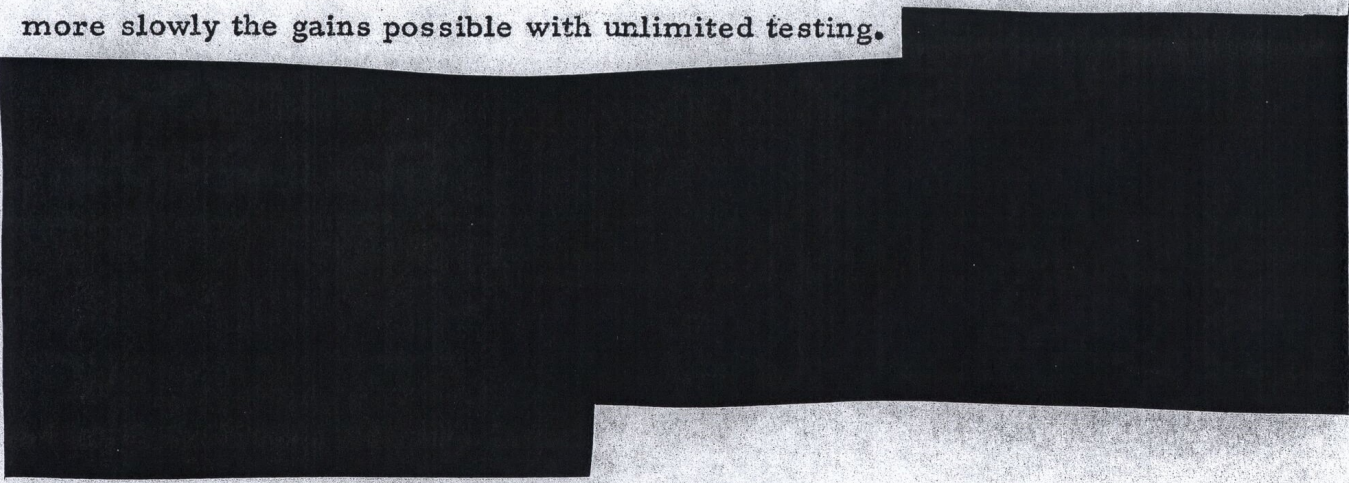
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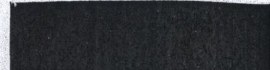
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By calculations and laboratory hydronuclear experiments involving energy releases up to about a ton of high explosive equivalent, both the U. S. and the USSR could make substantial improvements in the economy of utilization of fissionable material in one stage fission weapons, probably approaching more slowly the gains possible with unlimited testing.



4. Unlimited Underground Tests (Case II)

In the event that the U. S. and the USSR both undertake unlimited underground testing, both would probably eventually, though not necessarily at the same time, achieve approximately the same  ratios and economy of materials, as well as diameters and radiation effects in the weight classes in which they are interested. In general, the USSR in 1958 was probably three years behind the U. S. in weapons development in this area. As indicated above, in the special area of enhanced neutron radiation effects, 



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5. No Further U. S. Testing and Maximum Soviet Underground Clandestine Testing (Case III)

If U. S. activities were limited to laboratory experiments while the USSR conducted successful clandestine underground tests to the maximum extent possible, the USSR could proof test radically new designs, while U. S. developments would be much more limited in scope. In this manner, the USSR could possibly exceed present U. S. capabilities in low yield tactical weapons in a period of about three years of active testing. If it is assumed that the USSR made a decision to begin clandestine testing at the beginning of the present moratorium, the USSR could already have been testing in this area for two and one half years. By testing in this manner, the USSR could, over a longer period of time, achieve all of the foreseen nuclear weapon developments in the low and medium yield range (up to 20 - 50 KT) relevant to tactical warfare. This would mean that the USSR could, over an extended period of time, achieve the limits in economy of conventional fission weapons and thereby more than compensate for any relative deficiency in the availability of fissionable material.

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consider the possibility of U. S. response with those nuclear weapons to which Soviet tactics might be vulnerable, as well as the possibility of escalation of nuclear warfare outside the existing geographical boundaries or even into strategic war.

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D. AICBM SYSTEMS

The AICBM problem must be considered both from the point of view of increasing our AICBM defense capabilities and of reducing the vulnerability of our ICBM's to enemy AICBM action. Nuclear tests have a bearing on the AICBM problem in the following areas: AICBM warheads; kill mechanisms; and "blackout" effects on radars and communications.

1. AICBM Warheads.

The present U. S. Nike-Zeus AICBM system is not limited by warhead performance [REDACTED] providing the forthcoming Kwajalein tests verify the predictions on intercept accuracy. Thus, the potential increase in yield [REDACTED] in this weight class is not of great importance in determining the effectiveness of Nike-Zeus. The limitation to the usefulness of Nike-Zeus results from the unfavorable exchange ratios of the cost of Nike-Zeus vs. increased enemy ICBM traffic, especially if the enemy uses decoys or other penetration aids. Although the Nike-Zeus warhead costs [REDACTED] this cost does not dominate the cost of the defense system due to the large radar and data processing requirements. There have been speculations whether one could increase the neutron radiation from an AICBM warhead and thus increase its effectiveness. Although improvements

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are possible, they are not believed to be of particular significance.

The USSR is undertaking a vigorous AICBM program; however, there is no specific evidence whether or not the USSR intends to use nuclear warheads in this system or whether it is based on the same concept as Nike-Zeus. While the USSR would have adequate nuclear warheads for a Nike-Zeus type system, they have [REDACTED] than those of the U. S. in this weight class. The USSR could, therefore, achieve greater relative reductions than the U. S. in the cost of the nuclear component of its AICBM system by testing either under the Case II, unlimited testing, or Case III, clandestine Soviet testing.

## 2. Kill Mechanisms

ICBM warheads are vulnerable to several different effects from nuclear explosions: X-ray impulse; neutron melting of fissionable material; debris impact, radiation effects on electronics; and blast.\* The theory of these effects is well known; some experimental information is available to the U. S. from earlier nuclear tests, and more detailed information can and is being obtained from laboratory experiments. [REDACTED]

[REDACTED] In view of the large back-log of information already available which has as yet not been applied to warhead design, nuclear effects

\*For an assessment of the present status, see Report of the Ad Hoc Panel on Warhead Vulnerability to the President's Science Advisory Committee, June 20, 1961.

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tests are not necessary during the next few years in order to undertake a program to reduce this known vulnerability of our ICBM warheads. However, the degree of reduction of vulnerability possible is severely limited by the [REDACTED] of our present deterrent missiles.

Although the USSR might be less aware of some aspects of these effects since they have probably not conducted any high altitude effects tests, the USSR should also either have or be able to obtain adequate information on these effects by calculations and in the laboratory for purposes of designing an AICBM system or reducing the vulnerability of its own weapons. Underground nuclear tests may be helpful to uncover unsuspected additional phenomena contributing to warhead vulnerability. In the longer run, over-all tests of the vulnerability of complete ICBM re-entry vehicles to nuclear explosions would remove some uncertainties; such tests would have to be carried out in the upper atmosphere and would be subject to uncertainties about detailed characteristics of enemy warheads.

There are a number of measures which could be undertaken to reduce the vulnerability of our nuclear warheads to these AICBM kill mechanisms, [REDACTED] to accommodate modifications to reduce warhead vulnerability or to reduce the problem by [REDACTED] [REDACTED] could be achieved by improvement in the yield to weight of nuclear warheads. However, this could also be accomplished by such measures as the following: 1) improved propulsion systems; 2) larger missiles; or 3) the utilization of existing lower weight warheads with smaller yields.

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3. "Blackout" Effects

The detonation at high altitude of enemy ICBM's or defensive AICBM's would cause serious "blackout" effects on certain radars and communications systems. The U. S. probably has more information on this problem than the USSR since the U. S. has conducted high yield tests at high altitudes while the USSR has probably not conducted any tests in this environment. Although the effects on some systems and equipment could be severe, the problem is well understood by the U. S. (and probably by the USSR). In principle, radar difficulties can be gotten around by going to higher frequencies, and alternate modes of communications are available. While more information on this problem might be useful, it is not critical to the operation of the Nike-Zeus AICBM system and could not be obtained by underground testing.

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**ITEM: 6D**

**DATE: 7/21/61**

**DOCUMENT DESCRIPTION:  
SUPPLEMENT**

**PAGES: 2**

**CLASS: TS**

**LOCATION:**

**NATIONAL SECURITY FILES**

**SUBJECTS: NUCLEAR WEAPONS, PANOFSKY  
PANEL, 8/4/61-9/5/61**

**BOX #: 303**



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August 4, 1961

**MEMORANDUM FOR THE PRESIDENT**

**Subject: Report of Panel on Nuclear Testing**

In response to Dr. Wiesner's request I have reviewed the report of the Panel on Nuclear Testing and have given consideration to the course of action which the United States should now pursue in the light of the conclusion of the Panel that any decisions in the near future concerning the resumption of nuclear testing can be governed primarily by non-technical considerations.

On the basis of this assessment it would appear that the dominant factors to be considered in determining US policy on this question in the immediate future are those relating to the over-all posture of the United States as regards our allies, world opinion, and the USSR, particularly in the light of our general approach to the problem of Berlin. Our policy on the resumption of nuclear testing should likewise take into account the effects of any present moves both on prospects of realistic negotiation on disarmament, and on the longer-range military security considerations to which the Panel has referred.

On the basis of these factors it would appear to me that the most advantageous course would be to defer any announcement of test resumption until at least the end of the year, to reaffirm in response to questions, US freedom to test upon prior announcement, and to proceed with such preparations as are necessary to achieve technical readiness for weapons tests of highest priority early in 1962. The announcement in each case would be only a few days before the actual test.

If on the basis of the Panel's assessment it is concluded that an early test resumption would not contribute significantly to our immediate preparations for a potential crisis in Berlin, I believe that a deferral of this step would serve to increase support and cooperation in those measures of preparedness we deem most essential. I believe, too, that deferral of such an announcement would enhance our position in the forthcoming General Assembly, increase support for our

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NARA Date <u>4/89</u>	

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position in the Geneva test ban negotiations, and afford the most favorable circumstances for the US initiatives contemplated in the field of disarmament.

In the longer range, it seems to me, considering the possible risks to the security of the country, testing for military weapons purposes should be resumed if a safeguarded treaty ban cannot be agreed, although the final determination should be made in the light of the circumstances existing at the time. Accordingly, I would urge that while deferring an announcement of test resumption pending at least the achievement of a state of technical readiness which would permit the conduct of a significant test series, preparations toward that end should proceed forthwith. The achievement of such a state of readiness would, I believe, contribute to the flexibility we will need in timing any announcement of test resumption, since I am convinced we should be prepared to follow any such announcement quite promptly with an actual test.

Mr. McCloy concurs in these recommendations.

/s/ George Ball

Acting Secretary

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**ITEM: 6G**

**DATE: 8/4/61**

**DOCUMENT DESCRIPTION:**

**SEABORG LETTER FOR WIESNER**

**PAGES: 1**

**CLASS: TS**

**LOCATION:**

**NATIONAL SECURITY FILES**

**SUBJECTS: NUCLEAR WEAPONS, PANOFSKY  
PANEL, 8/4/61-9/5/61**

**BOX #: 302**



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U. S. ATOMIC ENERGY COMMISSION  
WASHINGTON, D. C.

Office of the Chairman

SANITIZED

August 4, 1961

Dear Jerry:

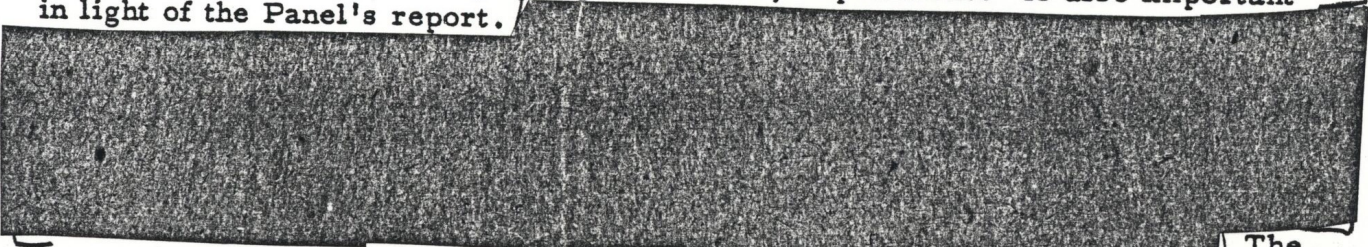
NCV-86-146  
BY mysm NARA DATE 7/87

The other Commissioners and I have studied the report of the Panel on Nuclear Testing that you forwarded on July 28, 1961. We are in general agreement with the findings and conclusions of the report. There are, however, two points which we believe should be brought to the attention of the President. These are our present state of readiness at the Nevada Test Site (NTS) for weapons testing and the question of "laboratory experiments."

With respect to test readiness it must be kept in mind that restricting tests to underground locations so as to completely contain the resulting radio-activity greatly increases the necessary preparations and time required for test readiness. It is perhaps not realized how little such preparation has actually been undertaken at NTS. While certain tests of specific devices could be begun within, perhaps, ten weeks, it would not be possible to execute a carefully planned and meaningful test series without additional preparations. The physical conditions of the site, rather than the program requirements, would in large measure dictate any test schedule. This situation can be changed only by several months of active preparations. Unless a comprehensive test readiness program is undertaken now, we cannot assure the President the flexibility of deciding to resume comprehensive tests on short notice.

We feel, therefore, that a greater degree of urgency should be attached to our technical readiness at NTS quite apart from the political decision whether or not to resume testing.

The second matter regarding "laboratory experiments" is also important in light of the Panel's report.

 The report does discuss the gains and limitations from hydronuclear testing, but does not point out that the USSR could now be doing precisely those kind of experiments described.

Cordially,  
/s/ Glenn  
Glenn T. Seaborg

Dr. Jerome B. Wiesner  
Special Assistant to the President  
for Science and Technology



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**DATE: 8/3/61**

**DOCUMENT DESCRIPTION:  
LETTER FOR WIESNER**

**PAGES: 1**

**CLASS: TS**

**LOCATION:**

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**SUBJECTS: NUCLEAR WEAPONS, PANOFSKY  
PANEL, 8/4/61-9/5/61**

**BOX #: 302**



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CENTRAL INTELLIGENCE AGENCY  
Washington 25, D.C.

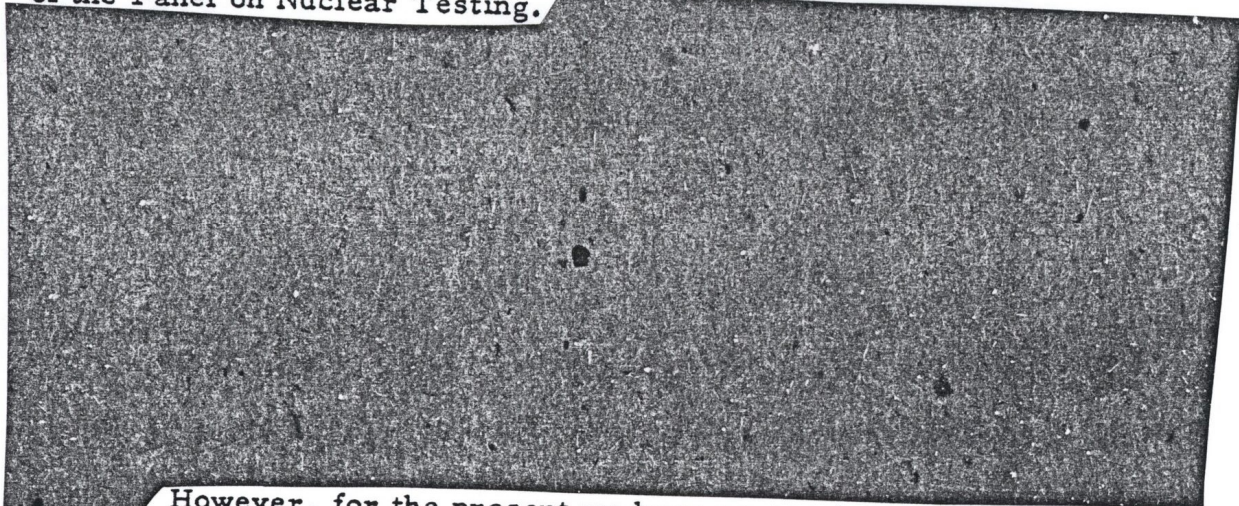
Office of the Director

3 Aug 1961

Dr. Jerome B. Wiesner  
Special Assistant to the President  
for Science and Technology  
The White House  
Washington, D. C.

Dear Jerry:

I appreciate the opportunity to review the 21 July 1961 report  
of the Panel on Nuclear Testing.



However, for the present we have no new important information  
to add to that presented in the Panel's report. We will, of course, keep  
you informed of any significant information that may be obtained in the  
future.

Sincerely yours,

Allen W. Dulles  
Director

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This material contains information affecting the national defense of the  
United States within the meaning of the espionage laws, Title 18, USC, Secs.  
793 and 794, the transmission or revelation of which in any manner to an  
unauthorized person is prohibited by law.

SANITIZED

NUK-86-145  
NARA DATE 8/88  
BY [signature]



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**ITEM: 6i**

**DATE: 8/3/61**

**DOCUMENT DESCRIPTION:**

**BROWN LETTER FOR WIESNER**

**PAGES: 2**

**CLASS: TS**

**LOCATION:**

**NATIONAL SECURITY FILES**

**SUBJECTS: NUCLEAR WEAPONS, PANOFSKY  
PANEL, 8/4/61-9/5/61**

**BOX #: 302**

SANITIZATIONS UPHOLD NLK 98-40, 4/03



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NLK-86-1417  
APPROVAL

DIRECTOR OF DEFENSE RESEARCH AND ENGINEERING  
Washington 25, D. C.

August 3, 1961

Dear Jerry:

In response to your letter of July 28, 1961, the Secretary of Defense has asked me, in view of the short time available for response, to reply for him. I am also enclosing comments of the Joint Chiefs of Staff on the report of your Ad Hoc Panel on Nuclear Testing.

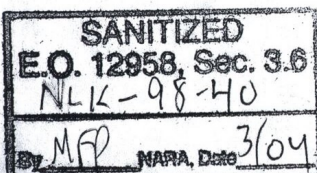
I agree with the Panel that we do not have sufficient evidence from any source to determine whether or not the USSR has been conducting [REDACTED] since November 1958. For this reason, it seems prudent to assume that they may have been doing so. Accordingly, I would add to the Summary, at the end of the second sentence in the second full paragraph on page 5 the phrase, "from whenever they start(ed)," and to the end of the Summary, page 6, the sentence, "It should be noted that the time scale should take into account possible [REDACTED] by the USSR since November 1958." The assessments of relative positions throughout the report, as on pages 15, 17, 24, 26, 27 and 32, seem to be accurate on the basis of 1958 data but do not indicate that the situation may be different now, as is clearly brought out in only one case on page 29.

The danger of closing off for a long period our own advances in nuclear weapons development, while the other side may continue, represents a greater risk if the arms race continues in other areas than it would if we could expect general arms limitation agreements. The Fisk Panel answered the questions about the technical and military effects of a test ban or a resumption of tests in the context that one possibility was a partially controlled agreement on nuclear testing, presumably to be followed by other agreements. Since the immediate prospects of arms limitation agreements seem more remote, the motivation for a Soviet violation of an unmonitored ban and consequent dangers to the U.S. appear greater.

Page 4 of the Summary points out that the significance of small pure fusion weapons depends on the extent to which future U.S. strategy emphasizes the use of nuclear weapons in tactical warfare. It also depends on future USSR tactics. If they emphasized such weapons and we did not have them, we could be at a distinct disadvantage, both militarily and politically.

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WH S&T Top Secret Cont. No. 116  
This document consists of 5 pages  
No. 40 of 50 Cys. Series B.





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On page 4, also, the unfavorable cost ratio of NIKE-ZEUS to enemy ICBM's is stated to be more significant than warhead performance or lack of knowledge of kill mechanisms. This is true. However, NIKE - ZEUS was designed to rely on known and conservative kill mechanisms and expensive warheads. If we knew more about the probable longer range lethal effects, the system might be quite different, and possibly much less costly. Furthermore, effects tests might show us how to reduce the vulnerability of our own ICBM warheads to a greater degree than we now believe possible. Thus, though my outlook for ballistic missile defense, at least of cities, is pessimistic, I believe that nuclear testing (and consequent warhead development) and better understanding of effects would have an important influence on both our ICBM penetration program and our AICBM efforts.

In summary, I find a stronger technical case for the resumption of nuclear testing than appears in the Ad Hoc Panel's report. I would agree that delay of a few more months is unlikely to have a substantial military effect, but over the long run (including the nearly three years since October 31, 1958) possible Soviet gains from testing must certainly be considered an important military disadvantage to the U.S. Therefore, the position of the Department of Defense, as previously stated by Secretary McNamara, is that nuclear weapons testing underground should be resumed as soon as it is politically expedient. Secretary McNamara's views were set forth more fully in the letter to Mr. McCloy dated July 28, 1961.

Sincerely,

/s/

HAROLD BROWN

Enclosure  
JCS Comments

The Honorable Jerome B. Wiesner  
Special Assistant to the President  
for Science and Technology

- 2 -

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**ITEM: 6J**

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**DOCUMENT DESCRIPTION:**

**COMMENTS RE: PANOFSKY REPORT**

**PAGES: 3**

**CLASS: TS**

**LOCATION:**

**NATIONAL SECURITY FILES**

**SUBJECTS: NUCLEAR WEAPONS, PANOFSKY  
PANEL, 8/4/61-9/5/61**

**BOX #: 302**



670

[REDACTED]

Comments of JCS on  
Report of the Ad Hoc Panel on Nuclear Testing  
contained in Memo for Secretary of Defense, dated  
2 August 1961

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"The Joint Chiefs of Staff have reviewed the Panofsky Report and agree with the panel that the report is essentially an updated Fisk Panel Report. In this connection, the comments of the Joint Chiefs of Staff contained in reference b remain valid in relation to the Fisk Report. Of particular significance is the nonconcurrence of the Assistant to the Secretary of Defense for Atomic Energy on the Fisk Report which contained views which were generally agreed to by the Joint Chiefs of Staff.

"The Joint Chiefs of Staff submit the following comments on the subject report:

a. There are many points in the report which are considered to be inaccurate or which express opinions and military judgments with which the Joint Chiefs of Staff do not agree.

b. [REDACTED]

(1)

(2)

(3)

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NUK 86-147 APPEND

NARA DATE 7/87

BY [Signature]



62

c.

d. The final conclusion loses a considerable amount of its validity when the report states that the possibility of new surprises in developments exists in the area of tactical nuclear weapons. The conclusion also overlooked phenomena in weapons effects of various kinds, and failed to evaluate the potential value of such break-throughs based on the erroneous conclusion that there is no established doctrine for the use of tactical weapons.

e. The Joint Chiefs of Staff cannot concur with the Panel's conclusion that from the military viewpoint there is little urgency connected with the U.S. resumption of nuclear testing, and that decisions in the near future on resumption of nuclear testing can be governed primarily by non-technical considerations. Earlier Panel statements that the possibility exists of important surprises in overlooked weapons effects and tactical weapon developments invalidates this conclusion. The Joint Chiefs of Staff consider that discoveries in these areas are potentially of sufficient importance that their unilateral achievement by the Soviets could result in a decisive Soviet military advantage. The fact that the US has refrained from pursuing these important discoveries by not testing since October 1958,

makes the US resumption of testing a matter of great urgency. In the interest of national security the US cannot afford the risk of unilateral Soviet discovery of these important new achievements in nuclear technology.

"An important element in the decision to resume nuclear testing is the psychological aspect associated with world-wide fallout. In this regard, the Joint Chiefs of Staff would like to re-emphasize the conclusions of the Chief, Defense Atomic Support Agency.

'The Chief of DASA desires to emphasize that world-wide fallout from past tests has not produced a biologic hazard. While contrary to some widely publicized statements, the above conclusion is based on a careful study of the problem. For many years DASA has conducted an extensive stratospheric sampling program. Data from this



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[REDACTED]

program coupled with extensive surveys of levels of radiation in soil, food and directly in people have shown conclusively that the levels of radiation exposure to important areas of the body which have been created from past tests (including the radiation effects of ingested Sr 90, Cs 137 and C 14) are only a few per cent (2 to 3%) of the natural radiation background. These are even smaller than the fluctuations in the background exposure as one moves from place to place on the earth. In light of these facts, it is believed that the testing philosophy of the United States should allow tests to be conducted in any environment for which information is required, including if necessary, all environments that have been employed in the past. As far as fallout is concerned, care should be taken, as can easily be done, to insure that local fallout does not descend into inhabited areas. The conduct of the above-ground tests, which are proposed, would increase the background radiation by less than 1/10 of 1%; consequently, any biological effects from world-wide fallout would be insignificant.'

"The Joint Chiefs of Staff reaffirm their views on the necessity for the resumption of nuclear testing."



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**BRADBURY LETTER FOR WIESNER**

**PAGES: 3**

**CLASS: S**

**LOCATION:**

**NATIONAL SECURITY FILES**

**SUBJECTS: NUCLEAR WEAPONS, PANOFSKY  
PANEL, 8/4/61-9/5/61**

**BOX #: 302**



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**IN REPLY**

July 17, 1961

**Dear Jerry:**

(1) What are the gains to be made from further nuclear weapon testing?

(2) What about the so-called "neutron bomb"?

(3) What about the "vulnerability" of weapons or nuclear weapon systems and testing?

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Dr. Jerome B. Wiesner

- 2 -

July 17, 1961

and calculations and the nature (and cost!) of corrective measures fairly well determined. More information for example on communication effects on large scale space or outer atmospheric effects could undoubtedly be obtained by testing there, but the general area does not seem to be of over-riding importance.

(4) What are the general military consequences of returning to testing?

Some improvement in the general military posture, but no radical change in national strength, and no "new dimensions" in warfare. Too much emphasis is probably placed on the nuclear warhead aspects of modern weapons. It is equally important that the weapon delivery system for them be accurate and reliable. For area targets an improvement in accuracy of delivery by about 35% is as good as doubling the warhead yield - and can be accomplished within a moratorium. The actual utility of troop-type tactical nuclear weapons is doubtful at best in current types of international difficulties.

(5) Have the Russians been testing secretly?

I, myself, do not think so. I would guess that they would regard the probable technical gains as too limited to warrant the chance of being found out.

(6) Should the U.S. return to nuclear weapon testing?

I see no strong reason for an early decision to do so. The weapon laboratories are very busy with current and available improvements. Progress is being made in applying laboratory techniques to nuclear weapon development without actual testing. While there are many things that would be done if testing were resumed, there does not appear to be a strong military urgency for the results. The current test ban negotiations, although disappointing, represent the first real attempt to alter the course of history with respect to the nuclear arms race. It will be a grave disappointment to have to admit failure of even this poor attempt, nor is it clear what new international situation will provide a better opportunity to succeed where there now seems to be failure. So serious does the eventual world nuclear weapon situation seem to be that, without clear evidence that the Russians were testing, I would personally prefer that the United States not be the first to resume this activity.

(7) Where are we with respect to the USSR in nuclear weapons?

[REDACTED]

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Dr. Jerome B. Wiesner

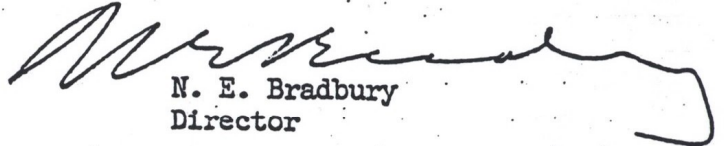
- 3 -

July 17, 1961

(8) Will the Russians cheat if we do not resume testing?

I doubt it for the same reasons that I doubt that they have been cheating. They might well trust to the improvement of their weapon systems to make up for any deficiency in their nuclear warhead capability.

Sincerely yours,

  
N. E. Bradbury  
Director

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**SUBJECTS: NUCLEAR WEAPONS, PANOFSKY  
PANEL, 8/4/61-9/5/61**

**BOX #: 302**



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- 1 -

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6m

- (1) The available decrease in size and/or weight of our smallest devices would appear to be rather small. [REDACTED]

[REDACTED] Steps in this direction will require much time and effort in development and the results are more likely than not to be accompanied by increases in unit cost.

In large yield devices [REDACTED] the gains at given weight will be achieved by increases in unit cost. [REDACTED]

- (2) As imagined, the "neutron bomb" would be impressively cheaper in reactor products at least for an initial equipment. But there are two points to keep in view. One is that a commitment to and dependence on a radioactively decaying stockpile (even with a 12-year half life) could turn into an economic and political nightmare. The other is that there is no reason to suppose that the cost of non-nuclear components will be reduced at all, so that the cost per device will not drop proportional to the saving in nuclear materials. [REDACTED]

[REDACTED] The practical effect of any such hypothetical savings can, across time, be compensated by accumulating production (of non-decaying material, useful in peace as well as war).

Partly because of the qualification suggested above, but even more clearly because of the high degree of sophistication required for this development - if it can be managed at all in a practically significant form for weapons - the suggestion that this may put a "potent nuclear capability" within the easy reach of every Tom, Dick and Harry is dangerous nonsense. Actually (probably) only if we show that such wonders exist will everyone else insist on having them too, and if they are in fact so panacean, then we shall have accentuated the "equalizing" nature of nuclear weapons.

- (3) Do not aspects of the question of "vulnerability" require an early resumption of tests?

Not in my view, at least not in any clear, unique, nor urgent way.

Vulnerability of a deterrent force could presumably be reduced by having mobile missiles or multiple warheads for long range. Part of this we have in Polaris, [REDACTED]

BY *[Signature]*  
NAFRA, Date 6/1/78  
E.O. 12958, Sec. 3.6  
N/AK-86-142  
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- 2 -

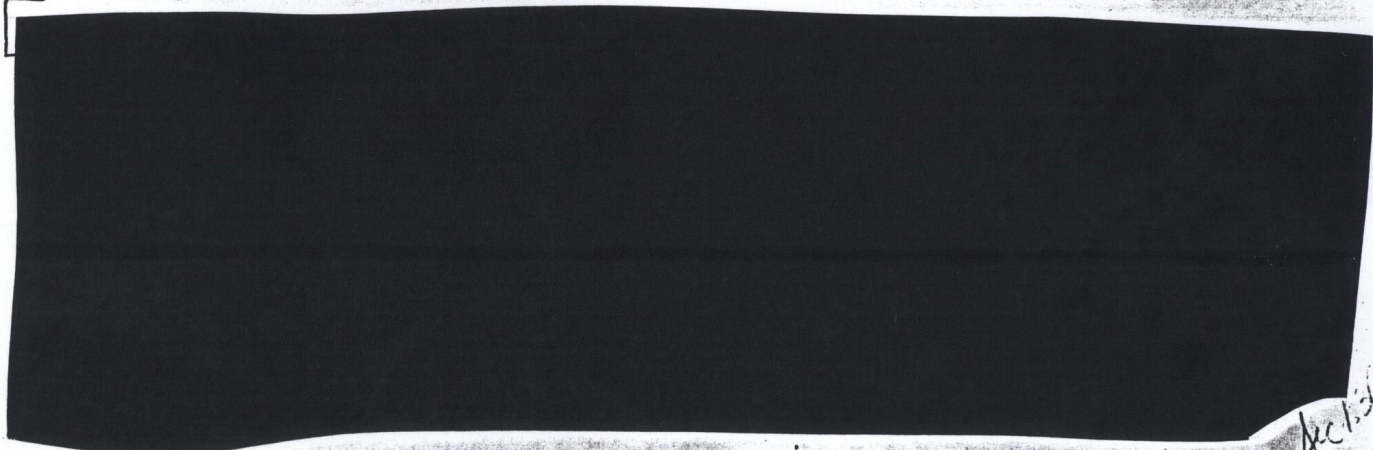
July 17, 1961

The clearest case (probably because we know the least about it) might be made for further study of the effects of explosions at altitude on long-range communications (guidance, acquisition, radar, etc.) where our experimental information is admittedly meager. Nevertheless our information is probably more extensive than anyone else's, and our further study of this would serve mainly to direct the attention of others to these questions so that our relative position would be unlikely to be improved.

- (4) No advances by testing can alter the fact that with systems available both to us and to potential opponents each can inflict physically and psychologically insupportable damage on the other. Improved designs may make it easier and cheaper (in some sense) but not more fearful; while less advanced designs may make it more costly and cumbersome but not less certain.

The other hard-core fact that is not usefully altered by testing is the "equalizing" nature of nuclear armament. By being so much cheaper and easier to apply than high explosives (and, by recourse to testing, being made presumably cheaper and easier still) countries which could never hope to compete with the U.S. in manpower or production capacity - nor production of nuclear weapons either, of course - may still be able over a period of a decade, say, to accumulate enough - not to beat us, but - to maim us, should they become sufficiently desperate or fanatical to choose to do so, in a way which, for example, [REDACTED] would not now be able to do under any circumstances. b6, b7C

- (5) One can ask, too, what the nature of the effect might be. The effect of testing is major when it bridges the gap between no nuclear weapons and some, or between pure fission (10's of kt) and thermonuclear (megatons) or between strategic devices weighing in the tons and lighter ones suitable for missiles.



- (6) ".....there does not appear to be a strong military urgency....," nor any way to make improvements effective in short time scales. (Lighter strategic warheads require new missile systems to be of new importance - fancier tactical devices, as

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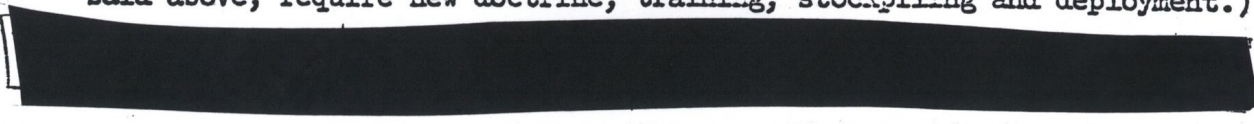
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- 3 -

July 17, 1961

said above, require new doctrine, training, stockpiling and deployment.)



b2c (b,2)(c)

*Carson Mark*

Carson Mark

CM:ds

- 1a - J. B. Wiesner
- 1b - N. E. Bradbury file

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62

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**JOHN S. FOSTER LETTER FOR WIESNER**

**PAGES: 2**

**CLASS: C**

**LOCATION:**

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**SUBJECTS: NUCLEAR WEAPONS, PANOFSKY  
PANEL, 8/4/61-9/5/61**

**BOX #: 302**



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UNIVERSITY OF CALIFORNIA

LAWRENCE RADIATION LABORATORY  
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60  
AUTHENTICATED Aug 2 1961  
U.S. ATOMIC ENERGY COMMISSION  
BY [Signature]  
DOCUMENT CXXVIII-132/1A

August 2, 1961

Dr. Jerome B. Wiesner, Chairman  
President's Science Advisory Committee  
The White House  
Washington 25, D. C.

Dear Dr. Wiesner:

I am writing to express some personal opinions as a member of your  
Ad Hoc Panel on Nuclear Testing.

[REDACTED]

We estimated the technical progress and  
military consequences of such testing, and concluded that the United  
States should resume the testing of nuclear weapons. In attempting to  
give more specific guidance as to the urgency of such a decision, it  
was not possible to obtain general agreement. Because I feel the question  
of urgency is of particular importance, I would like to express a general  
point in this connection.

In our competition with Russia for world supremacy, we are faced  
with a very serious military disadvantage. This disadvantage results from  
their successful veil of secrecy which permits us only meager information  
regarding their military status and plans. In our planning for the various  
contingencies, we are therefore forced to disperse our research effort,  
our stockpile of fissile material, our weapons systems and forces, so as  
to cover as best we can each of the areas we suspect could be critical.  
Even so, it is still possible for Russia to attain military superiority  
in several areas without our knowledge.

To date, we have relied mainly on a large effort in military research  
and development, conducted at a pace which is as fast as we can reasonably  
support. In this way we have some confidence of achieving a lead in  
several areas. During the last fifteen years, one of the main stimuli  
which has permitted advanced military weapons systems has come from

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E.O. 12958, Sec. 3.6

NLK/86-142

By [Signature] NARA, Date 6/1/98

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Dr. Jerome B. Wiesner  
Page 2.

CXXVIII-132  
August 2, 1961

research and development in the field of nuclear warheads. During the last 2½ years of the moratorium, we have essentially exhausted the fruits of past tests, and are now forced to rely mainly on the progress from research in other areas. There is no question but that the absence of nuclear testing is adversely affecting both our ability to maintain an aggressive posture in the development of new strategic and tactical weapons, and our confidence in the effectiveness of the weapon systems. Whether or not our efforts, even with testing, would be adequate to maintain supremacy in the military field is not known. It seems to me, however, that the margin is so thin that in the interests of national security we must make every attempt to achieve progress in all areas. Because of the great potential importance of many warheads which could be tested within the next year, we can no longer afford to postpone the decision.

In addition, it is misleading to evaluate the usefulness of nuclear tests only in terms of the improvements in military systems which the first round of tests will make possible, no matter how spectacular these improvements may be. What really matters is that we have severely narrowed our knowledge of what we can deduce from our past tests. From those tests we have the ability to develop and plan military systems only if we make some very restrictive assumptions about the conditions under which they will be used and to which they will be subjected. This gives a clear advantage to the Russians, even if they are not testing clandestinely and even if they know no more than we do - their use of secrecy permits them to emphasize specific systems and strategies without our knowing enough to counter.

In summary, I believe that whether or not the Russians are testing, our relative position is becoming steadily worse. Because of the military advantage they have achieved through their veil of secrecy, the United States must be as far ahead as possible. I have no doubt that if testing is resumed, the West can, if it wishes, make progress more rapidly than Russia. If the Panel had concluded that Russia had in fact been testing, then I feel that we would have urged that the President resume testing immediately. Because this is a most serious question involving national security, I believe the urgency is the same whether or not we have such definitive information.

Sincerely,

*John S. Foster, Jr.*

John S. Foster, Jr.

JSF:bld

1/4A - J. Wiesner  
2/4A - W. Panofsky  
3/4A - G. Seaborg  
4/4A - J. Foster

~~TOP SECRET~~



~~TOP SECRET~~

September 5, 1961

*Panofsky 7*  
EXEMPT  
11V-76-103  
NCR-84-122

MEMORANDUM OF MINUTES OF NATIONAL SECURITY  
COUNCIL MEETING - August 8, 1961

Subject: Panofsky Report

The meeting opened with an extensive summary of his panel's report by Dr. Panofsky. One point to which he gave particular emphasis was that the party which is engaged in concealment can always succeed if a sufficient effort is made. In summary, Dr. Panofsky made four points:

1. A ban on testing does impose limitations on our development;
2. Such limitations can in large measure be compensated for by improvements elsewhere in our technology.
3. In the long run, nevertheless, such limitations will impair our strength.
4. In the short run, the matter is not critical.

The President asked Dr. Panofsky to comment on the remarks of the JCS about his report. Dr. Panofsky replied that he could not make any intelligent comment because the criticisms of the Joint Chiefs were not spelled out.

Dr. Seaborg remarked that the Soviet Union may well be testing in the laboratory, with a much higher limit on what would be classed as a laboratory explosion. Dr. Seaborg wanted a higher limit on U. S. laboratory tests, and the President appeared to agree.

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E.O. 12958, Sec. 3.6
NLC-97-57
By <i>[Signature]</i> NARA, Date 1/98



(After the meeting, the President authorized Dr. Seaborg to conduct laboratory tests up to a limit of one-ton TNT equivalent. 7  
3)

Mr. McCloy reported Khrushchev's remark that, in a discussion of chemical explosions, "it all depends on what you mean by testing." He also reported that Khrushchev had told him that he was receiving pressure from the military not in technical but in strategic areas. Khrushchev had mentioned 100-megaton bombs as the economical way of using his large rockets.

General Lemnitzer said that the main concern of the Joint Chiefs of Staff was with the lack of intelligence on what the Soviets are doing and on the character and strength of Soviet weapons and the Soviet stockpile. The Joint Chiefs were further concerned about what the Soviet Union might have done since 1958. The Joint Chiefs were not currently advocating atmospheric testing. They objected strongly to the notion that there was no tactical doctrine for the use of atomic weapons. General Lemnitzer asserted that the Chiefs definitely do have such a doctrine. They did not object to a "reasonable delay" but the meaning of this phrase turned on definition. There would be a great disadvantage if we were confronted by the Soviets with their possession of a serious new weapon.

The President asked if under the doctrine of the JCS we could have a tactical nuclear war. General Lemnitzer's answer was in the affirmative but he recognized that many people would disagree.

There followed a careful discussion of the need for testing in connection with the development of the so-called neutron bomb. In this discussion it became clear that while tests would not be needed in the near future for the neutron bomb itself, they would be helpful in the area of "staging experiments" which might turn out to be a limiting factor upon the development of a neutron bomb as an effective weapon, if in fact such a device proves practicable. General Taylor strongly supported the need for the neutron bomb.

Dr. Wiesner pointed out that there were not yet any good studies of the precise effects of such a weapon, but Mr. Foster replied



that certain of its qualities were very clear, notably that the radius of effectiveness was very sharply defined.

The President asked what we could learn by testing in 1962 and Dr. Panofsky replied that we could pre-test the staging principle, move toward cleaner strategic warheads, and save time in the development of the neutron bomb, if the staging principle proved to be the most difficult problem. We could also test the weapon arrow, which would be useful on the assumption that we were using tactical weapons in great quantity, and we could substantially reduce the weight of a 100 kiloton weapon.

We could test for improved safety, and for unknown forms of vulnerability in our own weapons systems.

The President then asked what would happen if we should test underground while the Soviet Union tested in the atmosphere. This question received no decisive answer, although there was much sentiment to the effect that our own initial tests could be underground as well as not in any case.

Speaking in general support of testing, General Taylor argued that testing means progress and that progress means more to us than to the Soviet Union. At this point Director Dulles entered a strong defense of our intelligence on atomic matters, asserting that we know much more than General Lemnitzer supposed about the quality and content of the Soviet stockpile. The President stated that there ought to be a clarification of the differences between the JCS and others on this point, and he asked General Taylor to consult with General Lemnitzer, Mr. Dulles and Dr. Panofsky in order to define the disagreements and narrow them if possible.

Mr. McCloy believed that as a practical political matter we ought to wait until 1962 to test because of the U N General Assembly. As he read the Panofsky report, such a postponement was acceptable in technical terms. The President remarked that we have here a major political problem. We should clearly resume testing fairly soon, but the U N problem is a serious one. We would now have to emphasize the finding of our blue ribbon panel if we cannot prove that the Soviet Union is not testing. He would make a statement on this on Wednesday or Thursday.

McGeorge Bundy

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